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Notes on Geographic Distribution

Wiedomys cerradensis Gonçalves, Almeida and Bonvicino, 2005 (Mammalia: Rodentia: Cricetidae) in Tocantins and Goiás states, central-northern Brazil

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Abstract: We report two new localities for the rodent species *Wiedomys cerradensis* Gonçalves, Almeida and Bonvicino, 2005, previously known only from its type locality, in southwestern Bahia state, and one neighbor locality. Three new specimens were collected along the Paranã River Valley, in the Goiás and Tocantins states, central Brazil. These records extend the range of this species to the northwest, approximately 190 km. We provide external and cranial measurements of these specimens and comment on their morphology.

Wiedomys Hershkovitz, 1959 is a rodent genus endemic of Brazilian semiarid with two recognized species: *W. pyrrhorhinus* (Wied-Neuwied, 1821) and *W. cerradensis* Gonçalves, Almeida and Bonvicino, 2005. *Wiedomys pyrrhorhinus* occurs in the Caatinga biome of the states of Alagoas, Bahia, Ceará, Minas Gerais, Piauí, Paraíba, and Pernambuco, with its type locality in "Riacho da Ressaca", Tremedal municipality, Bahia state (BA), Brazil (Wied-Neuwied 1821; Musser and Carleton 2005; Oliveira and Bonvicino 2011). The other species, *W. cerradensis* is known from the type locality, in Fazenda Sertão do Formoso, Jaborandi, Bahia state, in the Cerrado biome (Gonçalves *et al.* 2005), and from the Fazenda Jatobá (Camargo *et al*. 2012; C.R. Bonvicino pers. com.), also at the municipality of Jaborandi.

Wiedomys cerradensis was described based on three specimens, and it differs from *W. pyrrhorhinus* mainly by its karyotype, with 2n (diploid number) = 60 and FNa (autosome arm number) = 88, as well as by morphological characters, like a smaller tooth row and presence of an alisphenoid strut separating the buccinator-masticatory foramen from the accessory oval foramen. *Wiedomys pyrrhorhinus* has a karyotype with a constant 2n = 62 and a variable FNa (86, 90, and 104), and lacks an alisphenoid strut (Gonçalves *et al.* 2005; Souza *et al.* 2011). These two species differ by 14.7-15.6% corrected genetic distance (Gonçalves *et al.* 2005).

The only available data on natural history of *W. cerradensis* mention that this species is mainly found in semideciduous forest (Gonçalves *et al.* 2005) and 'cerrado *sensu stricto*' (Camargo *et al.* 2012), a dense savanna dominated by shrubs and trees, comprising 40% of arboreal cover, often three to eight meter tall (Eiten 1972). It has arboreal habits (Camargo *et al.* 2012) but there is no information on diet, reproduction or population structure for this species.

Wiedomys cerradensis is listed as Data Deficient by the UICN (Bonvicino and Marinho-Filho 2008) due to its recent description and limited information on its distribution, occurrence, status, threats and ecological requirements. Recent and continuous studies of small non-volant mammals of the Cerrado have only produced additional records of *W. cerradensis* (Camargo *et al.* 2012; C.R. Bonvicino unpublished data) close to its type locality but not in protected areas. Thus, its natural rarity, little known distribution and absence in protected areas suggest that *W. cerradensis* may soon be included in official lists of threatened or vulnerable species.

The goal of the present study is to report the first record of this species for the states of Goiás and Tocantins, Brazil, thereby extending to the northwestern its known geographic distribution (Figure 1). We also provide external and cranial measurements of the specimens and comments about its morphology.

We collected three specimens of *W. cerradensis* during an inventory at the Paranã River Valley. This valley, extending along 5.940.382 ha, comprising areas from the northeastern Goiás and southern Tocantins states, is a depression between the Central Goiano Plateau, limited at the east by the Serra Geral de Goiás, which is also the geographic limit between the Cerrado and Caatinga biomes (13°20' - 15°40' S, 46°35' - 47°30' W) (Silva and Scariot 2003). Consequently, the landscapes of the sampled areas are characterized by presence of the typical environments of the Cerrado biome and by xeromorphic formations characteristics of the Caatinga (Murphy and Lugo 1986).

Wiedomys cerradensis was collected in two localities along the Paranã River Valley, one in the Goiás state (GO) and the other in Tocantins state (TO) (Figure 1). Habitat descriptions from the sampled localities and the vouchers obtained in each area are provided below:

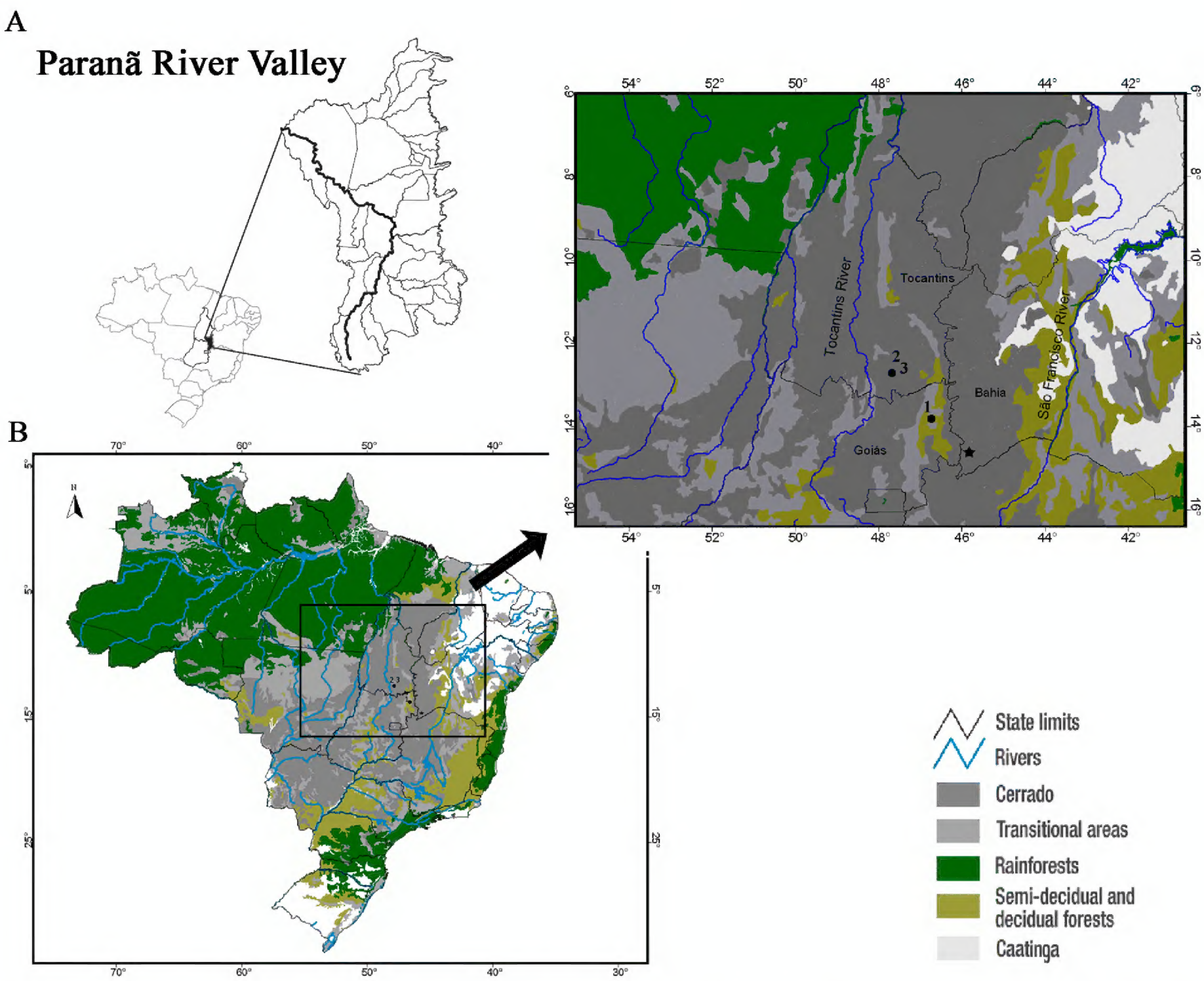

FIGURE 1. Map showing the location of the Paranã River Valley and the geographic distribution of *Wiedomys cerradensis*. Vegetation biomes follow IBGE (2004). The Paranã River Valley and the main rivers that form this region are shown in detail (A) modified from Werneck and Colli (2006), together with the type locality (solid star) in Jaborandi, BA, and the new records: 1) São Domingos, GO, 2) and 3) Paranã, TO. Map modified from Bezerra and Marinho-Filho (2010).

I. Fazenda Cruzeiro do Sul, São Domingos, GO – 1) UNB 2593, a female, juvenile, 16 g, captured on September 04 2003, ca. 1.5 m from the ground. The specimen was captured in a strongly deforested Seasonally Dry Tropical Forest (13°39'33.6" S, 46° 45'45.5" W), with discontinued canopy, few tall trees, pioneer plants and very close subcanopy.

II. Fazenda São João, Paranã, TO – 2) UNB 2594, a male, adult, 35 g, captured on April 25 2004. ca. 1,5 meter from the ground in a narrow gallery forest (12°54'50.5" S, 47°37'12" W) along a "cerrado *sensu stricto*" area with sandy soil. And 3) UNB 2595 (Figure 2), a female, adult, 37 g, captured on 26 April 2004, in a "cerrado *sensu stricto*" with sandy soil continuous to the gallery forest (12°54'50" S, 47°37'12" W).

The studied specimens were deposited in the Mammal Collection of the Departamento de Zoologia, Universidade de Brasília (UNB), in Brasília, Distrito Federal, Brazil. The following small non-volant mammals species were also captured in the same transects that *W. cerradensis* as follow: I. São Domingos, GO – *Gracilinanus agilis* (a female, UNB 2605); and II. Paranã, TO – *Cryptonanus agricolai* (one female, UNB 2588, and four males, UNB 2587, UNB 2589-2591), *Didelphis albiventris* (a male UNB 2562), *Gracilinanus agilis* (two males, UNB 2613 and UNB 2614), *Cerradomys scotti* (a female, UNB 2585), *Thrichomys apereoides* (a female, UNB 2570, and a male, UNB 2572).

The identification of *W. cerradensis* was based on cytochrome *b* DNA (GenBank accession numbers KC456168, KC456169, and KC456170) analyzed with other *Wiedomys* samples by Souza (2011), including *W. cerradensis* specimens from the type locality (GenBank accession numbers KC456171 and KC456172). Among the *W. cerradensis* morphologic characteristics considered for species diagnosis (Gonçalves *et al.* 2005) only the smaller molar rows (see table 1) were observed. The alisphenoid strut separating the buccinator-masticatory foramen from the accessory oval foramen was not present in all specimens herein analyzed. This character was also found to be variable in *W. pyrrhorhinus* (Pereira and Geise 2007; Souza 2011), indicating that the alisphenoid strut condition is not useful to separate the *Wiedomys* species.

Measurements of these new records along with the measurements of the holotype of *W. cerradensis* are given in Table 1.

The specimens reported in this paper represent the first record of *W. cerradensis* in Goiás and Tocantins states and extend the known western limit of this species distribution by 186 km and north limit by 189 km (Figure 1). The rodent diversity in central Brazil is still far from being completely described.

Table 1. Measurements of the new records of *Wiedomys cerradensis* from the states of Goiás and Tocantins, Brazil and the holotype of *W. cerradensis* from Gonçalves et al. (2005). All measurements in millimeters (mm), taken to the nearest 0.01 mm. Museum acronyms: Universidade Brasília, Distrito Federal, Brazil (UNB), and Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (MN).

Characters	UNB 2593	UNB 2594	UNB 2595	Holotype MN 67022
Sex	♀, juvenile	♂	♀	♀
WG	16	35	37	-
TL	212.5	268	249	107*
T	128	165	145	142
HF	20.5	26.5	24.5	22.5
HFC	21	27	25	-
IE	19.5	20	22	19
BL	5.62	7	6.20	-
BRB	11.82	13.01	12.33	11.61
CB	18.61	20.65	20.41	25.15
CD	8.11	9.25	9.96	8.54
DL	5.82	6.49	6.46	6.24
FL	7.66	9.15	9.42	-
GLS	25.25	27.68	27.72	27.85
IFB	1.76	1.99	1.80	1.78
IFL	5.31	5.37	5.40	5.34
IO	4.01	4.34	4.39	4.44
LML	4.36	4.34	4.43	4.35
M1	1.22	1.09	1.16	1.28
ML	12.65	14.73	14.25	-
MLR	6.12	7.44	6.91	-
MX	2.68	2.90	2.75	-
NB	2.70	2.82	2.95	-
NL	8.75	9.63	10	-
OC	5.53	6.14	6.52	6.04
OL	8.55	9.77	9.82	-
PLL	4.04	4.77	4.30	-
PPL	8.73	10.08	9.90	-
RB	3.93	4.36	4.39	4.67
RL	8.38	9.93	10.72	-
UML	4.36	4.34	4.34	-
ZB	12.70	14.40	14.34	13.89
ZPB	1.92	2.35	2.80	-

* Total length (TL) without tail (T).

Twenty six (26) craniodental measurements, modified from Bezerra and Oliveira (2010) and Souza (2011) were taken from all three specimens with a digital calliper (Mitutoyo ®) to 0.01 mm precision. Weight and five external measurements were taken in the field with a spring scale (Pesola ®) to 2 g precision and a stainless steel ruler, respectively. The measurements were abbreviated and defined as following: weight in grams (WG); total length (TL); tail length (T); hind-foot length (HF); hind-foot length with claw (HFC); internal ear length (IE), from notch; greatest length of tympanic bulla (BL); braincase breadth (BRB), immediately posterior to the zygomatic arches; condylo-incisive length (CB), from anterior pre-maxilla to most anterior side of occipital condylo; cranial depth at immediately anterior to tympanic bulla (CD); diastema length (DL), from posterior side of the incisor to anterior side of the M1; frontal length (FL), measured at sagittal suture, between nasal and parietal sutures; greatest length of skull (GLS), from anterior side of the nasal to the occipital crest; incisive foramina breadth (IFB); incisive foramina length (IFL); interorbital constriction (IO), least distance between orbits; length of lower molars row (LML), at the crown margins; M1 breadth (M1), largest distance between crows at first upper molar; mandible length (ML); Mandibular Ramus Length (MRL), from the anterior side of incisor alveolus to the mandibular condyle; palatal breadth (MX), greatest width between of palate measured across M1 and M2 edge; nasal breadth (NB), measured at largest breath of the nasal bones; nasal length (NL); occipital condyles width (OC), largest distance between the dorsal lobules of the occipital condyles; orbital length (OL), largest diagonal distance inside the orbit; palatal length (PLL), from the posterior edge of incisive foramen to the anterior margin of mesopterygoid fossa; postpalatal length (PPL), from anterior margin of mesopterygoid fossa to the most anterior margin of magnum foramen; rostral breadth (RB), at capsular processes of superior incisors; rostral length (RL), from the anteriormost extreme of rostrum to the anterior margin of the maxillar-frontal suture, at the internal lateral of the orbit; upper molars row length (UML); and greatest zygomatic arch breadth (ZB), zygomatic plate least breadth (ZPB).

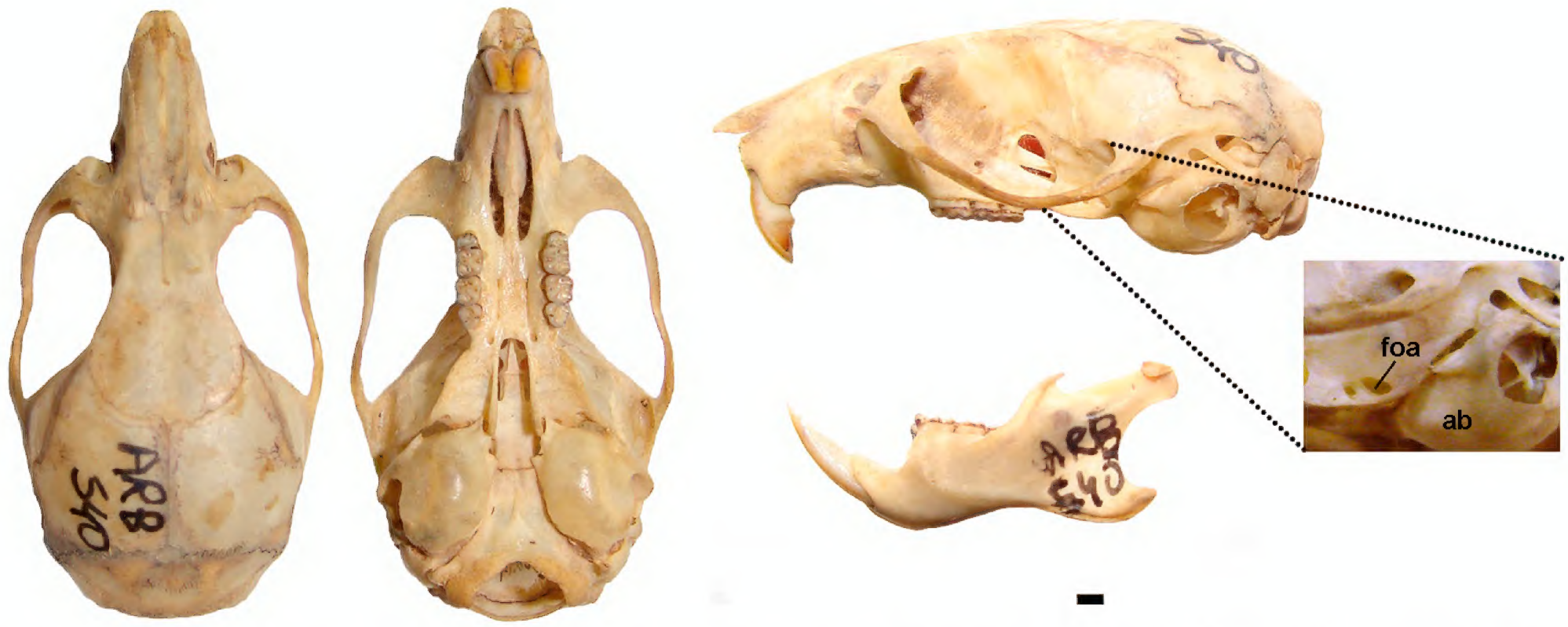

Figure 2. Dorsal, ventral, and lateral views of the skull with alisphenoid region in detail, and dorsal and lateral views of the mandible of *Wiedomys cerradensis* (UNB 2595). Acronyms: ab, auditory bulla; foa, foramen ovale acessorious. Picture: A.M.R. Bezerra. Scale bar = 1 mm.

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